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Indian Standard

GLOSSARY OF TERMS USED IN RUBBER INDUSTRY

PART 3 DEFINITIONS RELATING TO PROPERTIES AND TESTING

(First Revision)

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Indian Standard

GLOSSARY OF TERMS USED IN RUBBER INDUSTRY

PART 3 DEFINITIONS RELATING TO PROPERTIES AND TESTING

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0. FOREWORD

0.1 This Indian Standard (Part 3) (First Revision) was adopted by the Bureau of Indian Standards on 5 February 1988, after the draft finalized by the Rubber Sectional Committee had been approved by the Petroleum, Coal and Related Products Division Council.

0.2 This standard was originally formulated in six parts of IS : 7503 'Glossary of terms used in rubber industry', covering the following terms and definitions:

Part 1-1974 Definitions of general terms and terms pertaining to latex and physical chemical properties and testing, commonly used in rubber trade and industry

Part 2-1976 Terms relating to compounding process, machinery and vulcanization used in rubber industry

Part 3-1979 Terms relating to calendering, coating, and moulding commonly used in rubber, trade and industry

Part 4-1979 Terms relating to extrusion commonly used in rubber trade and industry

Part 5-1981 Terms relating to process

Part 6-1986 Definitions relating to cellular materials

The various terms had been grouped together into the above six parts, as and when they came up. However, keeping in view the latest rationalized classification, existing in ISO 1382-1982, these terms have now been re-grouped into six parts (Parts 1 to 6) afresh under new rationalized and amplified classifications as follows:

Part 1 Definitions of basic terms (general terms and basic terms concerning latex)

Part 2 Definitions of additives (general terms, additives relating to vulcanization, protective agent, fillers and colours, extenders and plasticizers, special chemical and latex additives)

Part 3 Definitions relating to properties and testing (general terms, uncurved properties, properties and testing relating to cure, mechanical and physical properties, degradation properties and testing, properties and test specific for latex and chemical properties and tests)

Part 4 Definitions relating to processing (general terms processing machine and processing of latex)

Part 5 Definitions relating to products—Hoses

Part 6 Definitions relating to cellular materials

0.3 In the present standard, some of the terms listed below which were present in the original parts of IS : 7503 have now been deleted and some new terms have been included:

a) *Terms deleted* — Accelerated ultra, anti-cracking agent, banding time, book, calender crown, chalk blower, clamp, coefficient of vulcanization, core, density, die holder, dielectric, dielectric constant, dielectric strength, dilatency, doubling machine, draw, dumb-bell test piece, elongation, face cloth, former, frame, gum dipping, haul-off equipment, impulse, inhibitor, insert pin, iodine number, micelle, modulus, mould finish, peak cure, pelletizer, premature coagulation, rate of cure, raw rubber, relative density, rubber hydrocarbon, separating agent, sheet rubber, shrink, skimmed fabric, stock, thixotropy, tip, treated liner, under cure, viscosity, vulcanizate and warming mill.

b) *Terms added* — Adhesion strength, cure rate index, field latex, mix, mooney viscosity, stress relaxation and visco-elasticity.

0.4 In the preparation of this standard, assistance has been derived from the following publications:

a) ISO 1382-1982 Rubber vocabulary. International Organization for Standardization (ISO).

b) BS 3558-1980 Glossary of rubber terms. British Standards Institution.

0.5 In case there is any difference between the definitions in this glossary and those in the standards for individual materials, the latter shall prevail.

1. SCOPE

1.1 This standard (Part 3) defines the terms relating to properties and testing commonly used in rubber industry.

2. TERMINOLOGY

2.1 General

2.1.1 *Elasticity* — The tendency of a material to return closer to its original size and shape after having been deformed.

2.1 2 *Test Piece (Specimen)* — A piece of material appropriately shaped and prepared so that it is ready for use in a test.

2.1.3 *Visco-elasticity* — Stress response of a material as though it were a combination of an elastic solid and a viscous fluid with flow dependent on time, temperature, load and rate of loading.

2.2 Uncured Properties

2.2.1 *Mooney Screch* — Time measure of incipient vulcanization characteristics of a rubber mix, using a Mooney shearing disc viscometer.

2.2.2 *Mooney Viscosity* — A measure of the torque on a rubber or rubber compound/mix determined in a Mooney shearing disc viscometer under specified conditions.

2.3 Properties and Testing Related to Cure

2.3.1 *Cure Rate Index* — The average slope of the rising cure curve obtained in a curemeter.

2.3.2 *Curemeter* — An instrument used to measure the curing characteristics of rubber compound as a function of time at a particular temperature.

2.3.3 *Optimum Cure* — The state of vulcanization at which an acceptable compromise between a number of desired properties is obtained.

2.3.4 *Over Cure* — A state of excessive vulcani-zation.

2.3.5 *Post Cure* — Heat treatment of a vulcanizate which is carried out after vulcanization to enhance one or more properties.

2.3.6 *Reversion* — The degradation of vulcanized rubber on cure beyond optimum curing conditions.

2.3.7 *Semi-Cure or Part Cure* — Incomplete cure purposely given to rubber compound to impart shape to the article before completion of the cure.

2.4 Mechanical and Physical Properties

2.4.1 *Abrasion* — The wearing away of a material surface by friction.

2.4.2 *Abrasion Resistance Index* — The ratio of the loss in volume of a standard vulcanizate to the loss in volume of a test vulcanizate measured under the same specified conditions and expressed as a percentage.

2.4.3 *Abrasion Resistance* — The resistance to wear resulting from mechanical action upon a surface. It is expressed by the abrasion resistance index.

2.4.4 *Adhesion Strength* — Force required to cause separation at the interface of the bonded components.

2.4.5 *Bench Marks* — Marks of known separation applied to a test piece and used to measure strain.

2.4.6 *Breakdown Voltage* — The potential required to puncture the dielectric when the electrodes are in contact with the material and the voltage is increased at a specified rate.

2.4.7 *Compression Set* — Residual deformation of a test piece after removal of the compressive stress, expressed as the percentage ratio of the residual deformation to the initial dimension of the test piece or to the compression strain.

2.4.8 *Creep* — Time-dependent strain resulting from an applied stress.

2.4.9 *Cut Growth* — The number of flexing cycles required to cause an artificially made cut, of definite length on a rubber flexing specimen to increase in length by a definite percentage.

2.4.10 *Elastic Modulus (Stress at a Particular Strain)* — The force per unit of original cross-sectional area required to give a specified elongation.

2.4.11 *Electric Breakdown* — The maximum potential gradient that the material can withstand beyond which it will breakdown.

2.4.12 *Elongation* — The increase in length of a test piece under tension, usually expressed as percentage of the original length. When measured at the point of rupture, it is called elongation at break.

2.4.13 *Flexing* — Repeated bending of a flexible material under specific conditions.

2.4.14 *Flexing Cycles* — One complete operation of bending a test piece in accordance with a prescribed test method.

2.4.15 *Flexing Machine* — A mechanical device for testing the flex-resisting quality of a rubber article or compound under specified conditions.

2.4.16 *Flex-Resistance* — The resistance to repeated deformations produced by extending compression or bending forces or a combination of them.

2.4.17 *Hardness* — The resistance to indentation.

2.4.18 *Impact Resistance (Impact Strength)*— Resistance to fracture under mechanical shock force.

2.4.19 *Indentation* — The penetration of the indentor of a hardness measuring device into test specimen.

2.4.20 *Insulation Resistance* — An impressed direct voltage determined by measuring the small leakage current which flows through the insulation.

2.4.21 *International Rubber Hardness Degrees (IRHD)* — A measure of hardness, the magnitude of which is derived from the depth of penetration of a specified indentor into a test piece in specified conditions. The scale is so chosen that 0 IRHD would represent a material showing no measurable resistance to indentation and 100 IRHD would represent a material showing no measurable indentation.

2.4.22 *Microhardness* — Measure of hardness using a scaled down version of the normal IRHD test, permitting testing of thinner and smaller test pieces.

2.4.23 *Permanent Set* — The residual strain in a test piece after it has been subjected to a given stress for a given time and then allowed to recover for a given time.

2.4.24 *Resilience* — The ratio of energy output to energy input in rapid (or instantaneous) full recovery of the deformed specimen.

2.4.25 *Stress Relaxation* — Time dependent stress resulting from an applied deformation.

2.4.26 *Tension Set* — The extension remaining after a test piece has been stretched and allowed to retract freely in a specified time, expressed as a percentage of the original length.

2.4.27 *Tensile Strength* — The force per unit of the original cross-sectional area applied at the time of rupture of a test piece.

2.5 Degradation Properties and Testing

2.5.1 *Ageing (the Act of)* — Exposure of a material to an environment for a period of time leading to irreversible change of properties.

2.5.2 *Age Resistance* — The resistance to deterioration after exposure to an environment for a period of time.

2.5.3 *Air Bomb* — An apparatus in which rubber may be aged rapidly in hot compressed air.

2.5.4 *Air Bomb Ageing* — Accelerated ageing in hot compressed air carried out in an air bomb.

2.5.5 *Air-Oven Ageing* — Ageing in an enclosure in the presence of circulating air, at elevated temperature, at atmospheric pressure, and in the absence of light.

2.5.6 *Bloom* — A liquid or solid material which has migrated to the surface of rubber compound or product.

2.5.7 *Oxygen-Bomb Ageing* — Accelerated ageing in hot compressed oxygen carried out in an oxygen bomb.

2.5.8 *Test-Tube Ageing* — Ageing of rubber samples in hot air in a large test-tube provided with an arrangement for natural air draught.

2.6 Properties and Tests Specific for Latex

2.6.1 *Dry Rubber Content* — The concentration of rubber in a latex, usually expressed as a percentage by mass.

2.6.2 *KOH-Number (of Latex)* — The number of grams of potassium hydroxide equivalent to the acid radicals combined with ammonia in latex containing 100 g of total solids.

2.6.3 *Mechanical Stability of Latex* — The resistance to clotting of latex when subjected to mechanical shear under specified condition.

2.6.4 *Total Solids* — The portion, expressed as a percentage by mass, of matter not volatile at 100°C, in latex.

2.6.5 *Volatile Fatty Acid (VFA) Number* — The number of grams of potassium hydroxide equivalent to the volatile fatty acid in latex containing 100 g of total solids.

2.7 Chemical Properties and Tests

2.7.1 *Acetone Extract* — Material extracted from rubber by acetone under specified conditions.

2.7.2 *Acid Number* — The number of milligrams of potassium hydroxide necessary to neutralize the free fatty acids in 1 g of the rubber.

2.7.3 *Alcoholic Potash Extract* — Material removed from rubber by treatment with alcoholic potash solution after removal of the acetone and chloroform extracts.

2.7.4 *Bound Rubber* — The portion of the rubber hydrocarbon in a mix which is so closely associated with filler as to be insoluble in the usual rubber solvents.

2.7.5 *Chemical Resistance* — The resistance offered by rubber products to physical changes or chemical reactions as a result of contact with or immersion in various chemicals.

2.7.6 *Chloroform Extract* — Material extracted from vulcanized rubber with chloroform after removal of the acetone extract.

2.7.7 *Combined Sulphur* — The sulphur, in vulcanized rubber, which is chemically combined with rubber.

2.7.8 *Free Sulphur* — The uncombined sulphur present in vulcanized rubber.

2.7.9 *Gel Rubber* — Portion of raw rubber insoluble in a specified solvent.

2.7.10 *Sol Rubber* — Portion of raw rubber soluble in a specified solvent.

2.7.11 *Swelling* — Increase in volume or linear dimensions of a test piece/article when immersed in a liquid or exposed to vapour.

2.7.12 *Water Extract* — Material extracted from rubber with water under specified conditions.

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